Oral Care Provided by Certified Nursing Assistants in Nursing Homes

Patricia Coleman, PhD, RN, APRN, BC, ANP, and Nancy M. Watson, PhD, RN

The purpose of this study was to describe the actual daily oral care provided by certified nursing assistants (CNAs) for dentate elderly nursing home (NH) residents who required assistance with oral care. The study was conducted in five nonrandomly selected NHs in upstate New York using real-time observations of CNAs providing morning care to residents, retrospective chart review, and CNA screening interviews. Oral care standards developed and validated by a panel of 10 experts (dentists, dental hygienists, registered nurses) to be appropriate for dentate NH residents were used to evaluate the oral care provided by 47 primary day-shift CNAs to a convenience sample of 67 residents. CNAs were blinded to the study's specific focus on oral care. Adherence to individual standards was low, ranging from a high of 16% to a low of 0%. Teeth were brushed and mouths rinsed with water in 16% of resident observations. One resident had her tongue brushed.

Standards never met were brushing teeth at least 2 minutes, flossing, oral assessment, rinsing with mouthwash, and wearing clean gloves during oral care. Most residents (63%) who received oral care assistance were resistive to CNA approaches. For most observations, oral care supplies were not evident. Actual oral care provided to residents contrasts sharply with CNAs' self-reported practices in the literature and suggests that NH residents who need assistance receive inadequate oral health care. **J Am Geriatr Soc 54:138–143, 2006.**

Key words: oral health care; nursing homes; certified nursing assistants

Elderly nursing home (NH) residents have extensive oral disease and poor oral hygiene and suffer the worst oral health of any U.S. population.[1] Poor oral health is associated with poor nutrition, pain, weight loss, diminished quality of life, and serious illnesses in old age (e.g., lung disease, cardiovascular/cerebrovascular disease, diabetes mellitus, systemic infection).[2–5] The morbidity associated with oral disease and these serious illnesses can be minimized with daily oral care and dental care.[6] The cost savings attributed to decreased NH-acquired pneumonia alone through improved oral hygiene has been estimated to be more than $800 million annually.[7]

Certified nursing assistants (CNAs) have responsibility for oral hygiene in NHs, but lack of staff, time, knowledge, protocols, and regulations and uncooperative residents make it a low priority.[8–11] The only data on CNA oral care practices are based on self-reported frequent oral care,[8,12–14] despite poor oral hygiene of residents. This discrepancy between reported behavior and clinical status suggests that oral care may not be implemented correctly or consistently, jeopardizing achievement of a national health objective—to ensure adequate oral health of elderly NH residents.[1] Thus, CNA oral care practices in NHs are largely unknown.

METHODS

The purpose of this study was to describe the actual oral care of CNAs for dentate elderly NH residents who require assistance with oral care: What is the actual occurrence and duration of oral care? What are the behavioral approaches used? What are the behaviors of NH residents during care?

Setting

The study was conducted in five NHs (1,167 beds) in upstate New York (three not-for-profit, one for-profit, and one public NH). Bed size ranged from 120 to 526 (average 233). The NHs had between one and 12 survey deficiencies during the study period (mean 7.4; median 9), compared with the average of five in New York State overall and seven in the United States.[15]

Subjects

The subjects were a convenience sample of dentate (i.e., having at least one or more natural teeth) residents aged 65 and older who were dependent in oral care (i.e., requiring at least supervision/encouragement/reminding), in the NH

From the Center for Clinical Research on Aging, School of Nursing, University of Rochester, Rochester, New York.

This research was funded by the John A. Hartford Foundation Building Academic Geriatric Nursing Capacity Scholars Program.

Address correspondence to Patricia Coleman, PhD, RN, APRN, BC, ANP, Center for Clinical Research on Aging, University of Rochester School of Nursing, 601 Elmwood Avenue, Box SON, Rochester, NY 14642. E-mail: patricia_coleman@urmc.rochester.edu

DOI: 10.1111/j.1532-5415.2005.00565.x

0002-8614/06/$15.00

for at least 3 months, and not comatose or immediately terminal/hospice, and who had a primary CNA willing to be observed. Short-term rehabilitation residents were excluded. The CNAs observed were primary dayshift CNAs or those who had cared for the resident in the last week on the dayshift and had a minimum of 3 months' experience. Agency or float CNAs were excluded.

Procedure

The study used direct observations of CNAs providing morning care to residents, retrospective chart review, and CNA screening and postobservation interviews approved by the institutional review board.

Identification/Validation of Oral Care Standards

A panel of nationally and internationally known dentists with geriatric expertise (n = 4), registered nurses (n = 4) practicing in NHs, and dental hygienists with geriatric expertise (n = 2) validated practice standards from the literature. The degree to which the standards were considered appropriate for dentate older NH residents requiring assistance with care (i.e., face validity) was evaluated. Standards found to be appropriate to very appropriate were wearing clean gloves during oral care, asking/assessing the resident for mouth problems/concerns, brushing teeth with toothbrush and toothpaste (i.e., not using a swab/toothette), brushing teeth at least 2 minutes, brushing the tongue, rinsing the mouth with water, rinsing the mouth with mouthwash, and flossing teeth. Use of these eight standards was evaluated during observations of the morning care of 67 residents by 41 CNAs using a structured observational tool.

Identification of Resident/CNA Sample

Resident Sample. Residents potentially meeting study criteria were identified through brief chart review and screening interviews with nursing staff. CNAs were selected as the best source of a resident's level of assistance, because they are responsible for and most familiar with a resident's daily oral care, and existing NH documentation might not be current or valid. Resident dental status (number/presence of natural teeth) was available from the most recent dental examination by the NH dentist. CNAs most familiar with residents were interviewed to determine their dependence in oral care (i.e., "Do you have to assist or encourage the resident to brush his/her teeth?"). Residents not needing at least supervision were excluded. Distracter questions about dependence in bathing, grooming, and dressing were also included to keep the CNAs blinded to the study's specific focus on oral care. Consent was obtained from eligible residents (if appropriate) and their family/legal guardian. Cognitive functioning was measured using the Mini-Mental State Examination[16] after consent was obtained. A total of 207 residents were screened, of whom 102 did not meet inclusion criteria (i.e., 62 had no natural teeth; 18 were independent in oral care; 11 had morning care done at night; 7 had been in the NH less than 3 months; 4 were younger than 65). Thirteen declined to participate, and five proxies could not be located. Twenty consenting residents were lost to follow-up because of prolonged hospitalization/death, transfer, or lack of opportunity to observe. Thus, 67 (64%) of the 105 eligible residents were observed (Figure 1).

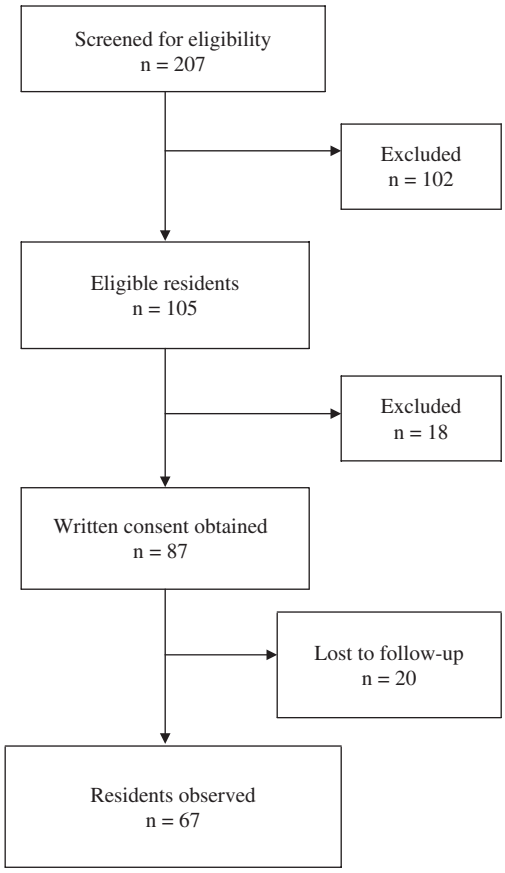

Figure 1. Derivation of the study sample.

CNAs Observed. The first author (PC) invited CNAs caring for eligible residents to participate. They were told that observations were to understand and describe morning care. Once willingness to be observed was confirmed, written consent was obtained from each CNA before observation. CNAs were instructed to provide morning care as they normally did. After all observations were completed, CNA interviews (n = 25) were conducted after additional written consent was obtained. All CNAs approached for observation (n = 41) or postobservation interview (n = 25) agreed to participate.

Observations of Morning Care

The first author observed residents and their primary dayshift CNAs once during morning care between January 2003 and December 2003 using a structured observational tool created for the study. Morning care consisted of dressing, bathing, transfer, toileting, changing incontinence products, oral hygiene, and grooming. The Resistiveness-to-Care Scale[17] was used as the basis for recording resistive behaviors (e.g., grabbing, pushing, clenching mouth) during oral care. The first author and another nurse observer conducted interrater reliability of the oral care standards (present/absent) and the resistive behaviors (occur/not occur) during observations on 10 residents. Because oral care was measured as dichotomous (present/absent) and seldom occurred, percentage agreement was used. Interrater reliability was 100% for all oral care processes. Resistiveness-to-care behaviors during oral care demonstrated at least 80% agreement.

Residents were observed from the beginning to the end of morning care. Observations took place in the resident's room or wherever care was done, with the observer being as unobtrusive as possible. Observations focused on the behavior of the primary CNA when more than one CNA helped. Observations began when the CNA greeted the resident or indicated that care was to begin or when the CNA began to prepare supplies (e.g., pulled curtain, shut door, gathered wash-basin/clothes). Cues/prompts included phrases such as "good morning," or "It's time to get washed/dressed." Observations ended when the CNA prompted the resident (e.g., "OK, you're done") or finished putting away supplies, whichever came last.

Observations of oral care began when the CNA began to assemble oral care supplies (e.g., emesis basin, toothbrush) or when the CNA cued/prompted the resident that it was time to brush (e.g., "Let's brush your teeth"), whichever came first. Oral care ended when the resident stopped brushing, the CNA prompted the resident (e.g., "OK, you're done"), or the CNA finished putting away supplies, whichever came last. Timing of toothbrushing was done with a digital watch, recording beginning and ending times. Timing began when the CNA/resident placed the toothbrush on tooth surfaces and began brushing. Timing ended when the CNA/resident stopped brushing and began to put supplies away or cues from the resident/CNA indicated that brushing was done (e.g., "You're done"). Interruptions to this process were not counted. Interrater reliability reached 70% agreement within ± 30 seconds for duration of toothbrushing. Oral care was the only care process timed. There was no indication, as evidenced by CNA behavior, that they suspected the specific focus of the observations (e.g., no change in attention given to oral care; no questions raised regarding focusing on oral care).

Data Analysis

Descriptive statistics were used to summarize CNA adherence to oral care standards and approach to care and resident behavior during oral care.

RESULTS

Resident Characteristics

Table 1 shows the demographic characteristics of the resident sample (n = 67). Participants were primarily female, white, and non-Hispanic and had significant impairments in physical/cognitive functioning and a dementia diagnosis—similar to national NH data.[18] Average number of teeth ± standard deviation was 20 ± 6.8 (range 2–28) (data not shown). A dentist had evaluated all residents (100%, 67/67) within the previous year. Only 63% (42/67) had their oral hygiene rated, and of those, 81% (34/42) were rated poor.

CNA Characteristics

The mean age of CNAs (n = 41) was 32.5 ± 8.0 (range 19–53). Most were female (90%, 37/41), black (76%, 31/41), and non-Hispanic (88%, 36/41). Most (83%, 34/41) were employed full-time and had at least a high school education (80%, 33/41). Average years of experience as a CNA was 7.5 ± 6.1 (range 1–36). These data are similar to national data on NH assistants.[19]

Table 1. Descriptive Statistics for the Resident Sample (N = 67)

Characteristic	Value
Age, mean ± SD (range)	83 ± 7.7 (66–96)
Female, n (%)	51 (76.1)
Widowed, n (%)	49 (73.1)
Mini-Mental State Examination score (range 0–30), mean ± SD (range)	6.8 ± 8.0 (0–29)
Race/ethnicity, n (%)	
Non-Hispanic white	64 (95.5)
Non-Hispanic black	3 (4.5)
Percentage requiring extensive to full staff assistance with ADLs (MDS rating 3 or 4), n (%)*	
Dressing	67 (100)
Bathing	67 (100)
Personal hygiene	63 (94)
Toileting	57 (85)
Transfer	45 (67)
Eating	28 (41.8)
Comorbidities, n (%)	
Dementia	60 (89.6)
Affective/mood disorder	51 (76.1)
Cardiovascular disease	53 (79)
Arthritis	42 (63)
Cataracts	38 (56.7)
Cerebrovascular accident	22 (32.8)
Pulmonary disease	20 (29.9)
Diabetes mellitus	16 (23.9)

*Minimum Data Set (MDS) activity of daily living (ADL) self-performance scores (MDS Section G. Physical Functioning, items 1b, g, h, i, j, 2 (0 = independent, 1 = supervision, 2 = limited assistance, 3 = extensive assistance, 4 = total dependence).
SD = standard deviation.

Oral Care in NHs

The average time for morning care (n = 67) was 21:38 ± 7:35 minutes (range 10:08–48:48). The average time spent on oral care was 1:12 ± 1:36 minutes (range 1:08–5:15) and was provided for only 16% of residents (Table 2). Sixteen percent (11/67) had their teeth brushed; five (45%, 5/11) had their teeth physically brushed by the CNA, whereas six (54%, 6/11) brushed their own teeth with supervision (e.g., verbal cueing). Eight (12%, 8/67) had their teeth swabbed with a toothette, considered inappropriate by the panel and current literature. None had their teeth brushed for 2 minutes. CNAs who brushed (n = 5) averaged 16.2 ± 5.3 seconds (range 10–22). Residents who brushed their own teeth (n = 6) brushed longer (39.3 ± 19.2 seconds; range 12–63). When residents brushed their own teeth, CNAs always prompted them to stop brushing, verbally directing them (e.g., "stop brushing now," "that's enough") or cueing them to stop (e.g., turning off the water faucet or putting supplies away).

The same 11 residents who had their teeth brushed also had their mouths rinsed with water (16%, 11/67). Mouthwash/freshener was never provided; therefore, residents

Table 2. Oral Care Provided by Certified Nursing Assistants for Dentate Residents (N = 67)

Oral Care Provided During Direct Observation*	Care Provided	
	%	n/N
Teeth were brushed with a toothbrush and toothpaste.	16.4	11/67
Teeth were brushed a minimum of 2 minutes.	0.0	0/67
Mouth was rinsed with water.	16.4	11/67
Mouth was rinsed with mouthwash.	0.0	0/67
Tongue was brushed with a moistened toothbrush.	1.5	1/67
Teeth were flossed.	0.0	0/67
Mouth problems/concerns were assessed.	0.0	0/67
Clean gloves were worn while providing oral care.	0.0	0/19†

*Based on standards identified by the expert panel. All standards scored as present/absent during direct observations.
†Residents who had teeth brushed or swabbed with a toothette.

who did not have their teeth brushed (84%, 56/67) were never offered mouthwash as an alternative. One resident with dementia (1.5%, 1/67) was instructed to brush her tongue. In this case, after the CNA told the resident to spit into the toilet after brushing her teeth, the CNA directed her by saying, "Now brush your tongue; you want to get all the worms out." The resident then brushed her tongue.

Clean gloves were never worn (0%, 0/19) whether teeth were brushed (n = 11) or swabbed (n = 8). For all oral care observed (11+8 = 19), it was done immediately after the CNA had changed soiled incontinence products or washed the perineal area but without changing gloves. In one observation, a resident was being dressed on a commode while she urinated and had a bowel movement. After the CNA (who was wearing gloves) finished dressing the resident, she assisted her to a standing position and wiped her buttocks and perineum. Then, with visible feces on her gloves, used a toothette to clean her teeth. No CNA offered or assisted with flossing, nor did any CNA ask a resident if they had any mouth problems/concerns or visually inspect the mouth.

CNA documentation of oral care on work flow sheets and resident treatment records were compared with observations. Documentation was available on only 9% of observations (6/67) and indicated that oral care was provided for all (6/6) residents when none was observed.

Observed Approaches to Oral Care

Although the panel did not specify, it was expected that residents would be upright or in a position for safe and dignified care. Some residents were inappropriately positioned. One resident was suspended in a mechanical lift in mid-air, above the natural reach of the CNA. As the CNA tried to brush the resident's teeth with one hand, steadying the liftpad with the other, the resident tried to bite the CNA. Other inappropriate positions included supine in bed or laying semisupine in shallow bath water. More than half of the time (63%, 12/19) CNAs inserted/attempted to insert a toothbrush/swab into a resident's mouth without telling the resident first. No CNA used praise/encouragement, complimentary speech, physical prompts, or gestures to facilitate care. No CNA smiled at the resident during observations in which facial expressions could be observed (10/19). When care was provided, it was accomplished quickly and methodically, ostensibly to ensure the smooth execution of the task. One CNA commented, "I make it a policy not to spend more than 10 minutes with a resident."

Supplies to Manage Oral Care in NHs

The presence/absence of supplies for oral care (e.g., toothbrush, toothpaste) was noted in the resident's bathroom, shower area, or contents of the washbasin the CNA used for care. Only 26.9% of residents (18/67) had a toothbrush and toothpaste visibly present, yet even when they were present, only 61% (11/18) received oral care. Mouthwash was occasionally present (17.9%, 12/67) but was not offered or used. No floss was present. Toothettes were present and used with 11.9% (8/67) of residents. For the majority (68.7%, 46/67), basic supplies were absent (i.e., no toothpaste, toothbrush, mouthwash, or toothette).

Resident Behaviors During Oral Care

Of the few residents (n = 19) who received any oral care (tooth-brushing or swabbing), 63% (12/19) were resistive. Most-frequent resistive behaviors were turning (75%, 9/12) or pushing away (42%, 5/12), clenching the mouth (58%, 7/12), and biting (or attempting to bite) the CNA or toothbrush/swab (33%, 4/12); 83% (10/12) displayed two or more resistive behaviors (average 3, range 1–6). Type of CNA assistance was related to resistance. Residents were more likely to be resistive when CNAs provided physical assistance (85%) than when they provided cueing or supervision (20%) (chi-square = 8.146, $P = .01$, using Fisher exact test).

DISCUSSION

This is the first observational study in U.S. NHs of oral care actually provided to residents by CNAs. Oral care is one of the most basic nursing functions, and these findings cause concern. They reveal a substantially different picture of daily oral care than previously understood and suggest that 1.6 million[20] older NH residents, many of whom need assistance, may not receive adequate care. Actual care contrasts sharply with CNAs' self-report of daily oral care: brushing (68–98%),[8,12–14] rinsing (48–90%),[8,14] flossing (8–26%),[8,12,13] swabbing (18–67%),[8,13] and mouth checks (26%).[12] Indeed, CNAs have reported brushing residents' teeth an average of 4 minutes,[14] longer than observed (16 seconds) and longer than estimates (40–60 seconds) reported by people who brush their own teeth.[21] Most residents did not have supplies, and CNAs did not attempt to obtain them, suggesting that oral care was not a norm. Most residents, despite profound self-care deficits, were not offered or did not receive oral care that CNAs have indicated in previous studies that they provide.

Federal regulations require NHs to provide necessary care and services (including supplies) to maintain oral hygiene for residents.[22] The participating NHs had policies that included tooth brushing twice a day, rinsing, and using mouthwash. Toothettes were recommended for edentulous residents or when tooth brushing was considered unsafe (e.g., aspiration risk), but documentation of oral care, unlike required documentation of similar daily care (e.g., feeding, repositioning, toileting), was virtually absent and was inconsistent with care observed. This finding mirrors others showing inaccuracies in NH documentation for many care processes delivered by CNAs.[23,24] Documentation of oral care, evidence of care planning, and monitoring of oral care delivery on an ongoing basis by supervisory staff must be part of practice guidelines for oral care in NHs. It is also critical that the external survey process recognize oral care, because survey deficiencies are a major source of motivation for NHs.

This study identified standards for oral care in NHs judged to be valid and important based on expert opinion. Although not exhaustive, they are consistent with recommended NH practices for dependent older people.[25] Implementation may be problematic. The panel was asked to evaluate their feasibility. Ease of implementation was rated as somewhat difficult to very difficult for most (75%, 6/8) standards (i.e., brushing teeth, brushing at least 2 minutes, rinsing with water or mouthwash, brushing the tongue, flossing). Barriers cited by the panel and study CNAs (n = 25) included low staffing, lack of time/support, resident behaviors, and fear of providing care. Similar barriers have been previously cited.[8,9]

Resistive behaviors have not been studied previously during oral care. Resistive behaviors were common and appeared to be related to how care was provided. CNAs provided care without warning and seldom used simple engaging communication techniques that could facilitate self-care and minimize resistive behaviors.[26,27] Inappropriate positioning suggested that resident comfort was not a priority. Residents who CNAs supported to perform their own care (i.e., supervision/cues) were less likely to be resistive. Thus, precipitating factors seemed modifiable. Approaches that change the social and physical environment should be explored, given their effectiveness in similar personal care.[28] CNA education is critical. Most CNAs interviewed (96%, 24/25) had received oral care instruction, but only 16% (4/25) felt prepared to manage difficult behaviors. Few (28%, 7/25) had attended an oral health in-service during the previous year; thus, CNAs need better educational preparation and competency training. The recommended ratio[29] of one CNA to five residents was not often met; CNAs observed cared for an average of eight residents (range 6–14), and 70% of assignments included a bath/shower. Although not statistically significant, CNAs who provided oral care had fewer residents than those who did not ($t = 8.98$; $P = .06$), suggesting that staffing may influence this care process, like others.[30]

Limitations

There are several limitations of this study. First, generalizability is limited because it was conducted in only five nonrandomly selected NHs using a convenience sample. Thus, it is unknown whether the low rate of oral care observed can be generalized, but it is likely that the care observed was the best care residents could expect, because it occurred while their CNA, who was familiar with their needs, was being observed (i.e., Hawthorne effect). Second, although the panel's recommendation for frequency of oral care was twice a day, observations were limited to morning care. Thus the results might underestimate care actually provided, although it is highly unlikely that CNAs would provide oral care later in the day. Even if residents had received oral care in the evening, the recommended standard (i.e., twice/day) would not have been met. Third, residents' independence in oral care was not verified via observation. It is possible that residents rated as independent by CNAs (9%, 18/207) actually required assistance and were inappropriately excluded. Thus, although it is possible that the sample may not have been representative of all those requiring assistance, there is no reason to believe that those excluded received any different care than observed. Fourth, the standards may not apply to all dentate residents and are not meant to be prescriptive, given the heterogeneity of NH residents. Studies are needed to determine to whom and how to deliver care consistent with these basic standards. Additionally, studies to expand the evidence base for these standards are also needed. Despite the limitations, this study provides the first empiric evidence of a potentially significant problem with oral care in NHs.

ACKNOWLEDGMENTS

Financial Disclosure: Patricia Coleman received funding from John A. Hartford Foundation Building Academic Geriatric Nursing Capacity Post-Doctoral Scholar Award. Nancy M. Watson received no financial support related to research reported here.

Author Contributions: Patricia Coleman contributed to study concept, design, acquisition of subjects/data, analysis and interpretation of data, and manuscript preparation. Nancy M. Watson contributed to study design, interpretation of data, and manuscript preparation.

Sponsor's Role: The sponsors took no role in any aspect of this paper.

REFERENCES

1. U.S. Department of Health and Human Services. Oral health in America: A report of the Surgeon General. Rockville, MD: U.S. Department of Health and Human Services, National Institute of Dental and Craniofacial Research, National Institutes of Health, 2000.
2. Locker D, Matear D, Stephens M et al. Oral health-related quality of life of a population of medically compromised elderly people. Community Dent Health 2002;19:90–97.
3. Scannapieco F. Role of oral bacteria in respiratory infection. J Periodontol 1999;70:793–802.
4. Taylor G, Loesche W, Terpenning M. Impact of oral diseases on systemic health in the elderly: Diabetes mellitus and aspiration pneumonia. J Public Health Dent 2000;60:313–320.
5. Joshipura K. The relationship between oral conditions and ischemic stroke and peripheral vascular disease. J Am Dent Assoc 2002;133:23S–30S.
6. Shay K. Infectious complications of dental and periodontal diseases in the elderly population. Clin Infect Dis 2002;34:1215–1223.
7. Terpenning M, Shay K. Oral health is cost-effective to maintain but costly to ignore. J Am Geriatr Soc 2002;50:584–585.
8. Chalmers J, Levy S, Buckwalter K et al. Factors influencing nurses' aides provision of oral care for nursing facility residents. Spec Care Dent 1996;16:71–79.

9. Coleman P. Oral health care for the frail elderly: A review of widespread problems and best practices. Geriatr Nurs 2002;23:189–197.
10. Coleman P. Opportunities for nursing-dental collaboration: Addressing oral health needs among the elderly. Nurs Outlook 2005;53:33–39.
11. Wardh I, Hallberg L, Berggren U et al. Oral health care—a low priority in nursing. Scand J Caring Sci 2000;14:137–142.
12. Hardy D, Brangan P, Darby M et al. Self-report of oral health services provided by nurses' aides in nursing homes. J Dent Hyg 1995;69:75–82.
13. Herriman G, Kerschbaum W. Oral hygiene care and education needs in long-term care facilities of Michigan. J Dent Hyg 1990;174:196–198.
14. Kambhu P, Levy S. Oral hygiene care levels in Iowa intermediate care facilities. Spec Care Dent 1993;13:209–214.
15. Nursing Home Compare [on-line]. Available at www.medicare.gov/NHCompare Accessed July 23, 2005.
16. Folstein MF, Folstein SE, McHugh PR. 'Mini-mental state'. A practical method for grading the cognitive state of patients for the clinician. J Psychiatr Res 1975;12:189–198.
17. Mahoney E, Hurley A, Volicer L. Developing and testing the Resistiveness to Care Scale. Res Nurs Health 1999;22:21–28.
18. Gabrel CS. Characteristics of elderly nursing home current residents and discharges: Data from the 1997 National Nursing Home Survey. Adv Data 2000;Apr:1–15.
19. Yamada Y. Profile of home care aides, nursing home aides, and hospital aides: Historical changes and data recommendations. Gerontologist 2002;42: 199–206.
20. National Center for Health Statistics. An Overview of Nursing Home Facilities: Data from the 1997 National Nursing Home Survey [on-line]. Available at www.cdc.gov/nchs/data/ad/ad311.pdf Accessed February 28, 2005.
21. Emling R, Flickinger K, Cohen D et al. A comparison of estimated versus actual brushing time. Pharmacol Ther Dent 1981;6:93–98.
22. Facility Guide to OBRA Regulations. Interpretive Guidelines and the LTC Survey Process. Albertville, AL: Heaton Publications, 2001.
23. Schnelle JF, Bates-Jensen BM, Chu L et al. Accuracy of nursing home medical record information about care-process delivery: Implications for staff development and improvement. J Am Geriatr Soc 2004;52: 1378–1383.
24. Simmons SF, Garcia ET, Cadogan MP et al. The Minimum Data Set weight-loss quality indicator: Does it reflect differences in care processes related to weight loss? J Am Geriatr Soc 2003;51:1410–1418.
25. Chalmers J, Johnson V. Evidence-based protocol: Oral hygiene for functionally dependent and cognitively impaired older adults. J Gerontol Nurs 2004; 30:5–12.
26. Kayser-Jones J, Bird W, Redford M et al. Strategies for conducting dental examinations among cognitively impaired nursing home residents. Spec Care Dent 1996;16:46–52.
27. Talerico K, Evans L. Making sense of aggressive/protective behaviors in persons with dementia. Alzheimer's Care Q 2000;1:77–88.
28. Sloane PD, Hoeffer B, Mitchell CM et al. Effect of person-centered showering and the towel bath on bathing-associated aggression, agitation, and discomfort in nursing home residents with dementia: A randomized, controlled trial. J Am Geriatr Soc 2004;52:1795–1804.
29. Harrington C, Kovner C, Mezey M et al. Experts recommend minimum nurse staffing standards for nursing facilities in the United States. Gerontologist 2000;40:5–16.
30. Schnelle JF, Simmons SF, Harrington C et al. Relationship of nursing home staffing to quality of care. Health Serv Res 2004;39:225–250.